TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
P37020-P0		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2004/017622	26.11.2004	01.12.2003
International Patent Classification (IPC) or national classification and IPC		
H01L21/3065		
Applicant		
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2004/017622

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-16 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. 2-8,10-12,14,16-19 as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* 1,9,15 received by this Authority on 29.09.2005

nos.* _____ received by this Authority on _____

☒ the drawings:

sheets 1-7 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, nos. 13

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2004/017622

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-12, 14-19	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-12, 14-19	NO
Industrial applicability (IA)	Claims	1-12, 14-19	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The following documents are cited in the international search report.

Document 1: JP 2002-542623 A (Lam Research Corp.), 10 December 2002, paragraphs [0026] to [0033]

Document 2: JP 2003-303812 A (Matsushita Electric Industrial Co., Ltd.), 24 October 2003, paragraph [0094] and fig. 1

Document 3: JP 2000-299310 A (Denso Corp.), 24 October 2000, paragraphs [0063] to [0072] and fig. 7

Document 4: WO 2003-030239 A1 (Sumitomo Precision Products Co., Ltd.), 10 April 2003, paragraph [0094] and fig. 1

Document 5: JP 2001-284283 A (Hitachi, Ltd.), 12 October 2001, paragraph [0098]

Claims 1 to 10, 18 and 19

Document 1 discloses a method for plasma etching a silicon object within a processing chamber, wherein trenches are formed in the aforementioned silicon object by introducing an etching gas that contains O_2, SF_6, He or Cl_2 into the interior of the aforementioned processing chamber and then converting the aforementioned etching

gas into a plasma by means of a TCP device.

Meanwhile, document 2 indicates that high-frequency power with a frequency in the range of 50 kHz to 500 MHz is applied to the coil of the TCP device. Such being the case, it would have been obvious to a person skilled in the art to configure so that high-frequency power with a frequency in the range of 50 kHz to 500 MHz is applied to the coil of the TCP device in the invention disclosed in document 1.

Furthermore, a person skilled in the art could set an appropriate frequency for the high-frequency power, regardless of the type of plasma etching gas that is used.

Such being the case, the inventions set forth in claims 1 to 10, 18 and 19 do not involve an inventive step.

Claims 11, 12 and 14

Document 1 discloses a method for plasma etching a silicon object within a processing chamber, wherein trenches are formed in the aforementioned silicon object by introducing an etching gas that contains O_2, SF_6, He or Cl_2 into the interior of the aforementioned processing chamber and then converting the aforementioned etching gas into a plasma by means of a TCP device.

Meanwhile, document 2 indicates that high-frequency power with a frequency in the range of 50 kHz to 500 MHz is applied to the coil of the TCP device.

Furthermore, document 3 discloses a trench formation method wherein trenches are formed by means of SF_6 gas, and then a protective film is formed upon the side walls of the trenches by means of a gas that

contains C_4F_8.

In addition, document 4 discloses a feature wherein trenches are formed by means of a gas system that contains SF_6 and C_4F_8, which is a gas for forming a protective film.

Documents 1, 3 and 4 all pertain to the same technical feature; i.e., forming trenches on a silicon substrate. Therefore, it is considered to have been easy for a person skilled in the art to conceive of forming trenches by means of the gas disclosed in document 1, which contains O_2, SF_6, He or Cl_2, and then forming both trenches and protective films by means of the gas system disclosed in document 4, which contains SF_6 and C_4F_8, in the light of the disclosures in document 3.

Furthermore, in the light of the disclosure in document 2 it would have been obvious to a person skilled in the art to configure so that high-frequency power with a frequency in the range of 50 kHz to 500 MHz is applied to the coil of the TCP device in the invention disclosed in document 1.

Such being the case, the inventions set forth in claims 11, 12 and 14 do not involve an inventive step.

Claims 15 to 17

Document 5 discloses a method for plasma etching a silicon object by means of Ar/CF_4. Therein, it would have been easy for a person skilled in the art to conceive of increasing the precision of the etching depth by adjusting the flow rate of the Ar or the CF_4 and by using a gas other than CF_4 in order to decrease the etching speed.

Such being the case, the inventions set forth in

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

claims 15 to 17 do not involve an inventive step.